

APPLICATION FOR FEDERAL ASSISTANCE
SF 424 (R&R)

1. TYPE OF SUBMISSION <input type="checkbox"/> Pre-application <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application		3. DATE RECEIVED BY STATE <input type="text"/>	State Application Identifier <input type="text"/>
2. DATE SUBMITTED <input type="text"/>		4. a. Federal Identifier N00014-20-S-F005	
Applicant Identifier <input type="text"/>		b. Agency Routing Identifier 311 [Simpson, Michael]	
		c. Previous Grants.gov Tracking ID <input type="text"/>	
5. APPLICANT INFORMATION Organizational DUNS: 0109896190000			
Legal Name: Curators of the University of Missouri on behalf of UMKC			
Department: <input type="text"/>		Division: <input type="text"/>	
Street1: 5100 Rockhill Road			
Street2: <input type="text"/>			
City: Kansas City		County / Parish: <input type="text"/>	
State: MO: Missouri		Province: <input type="text"/>	
Country: USA: UNITED STATES		ZIP / Postal Code: 64110-2499	
Person to be contacted on matters involving this application			
Prefix: Ms.		First Name: Lora	
Last Name: Owens		Middle Name: <input type="text"/>	
Position/Title: Grants & Contracts Administrator		Suffix: <input type="text"/>	
Street1: 5100 Rockhill Road			
Street2: <input type="text"/>			
City: Kansas City		County / Parish: <input type="text"/>	
State: MO: Missouri		Province: <input type="text"/>	
Country: USA: UNITED STATES		ZIP / Postal Code: 64110-2499	
Phone Number: 816-235-5621		Fax Number: <input type="text"/>	
Email: owensl@umkc.edu			
6. EMPLOYER IDENTIFICATION (EIN) or (TIN): 436003859			
7. TYPE OF APPLICANT: H: Public/State Controlled Institution of Higher Education			
Other (Specify): <input type="text"/>			
Small Business Organization Type <input type="checkbox"/> Women Owned <input type="checkbox"/> Socially and Economically Disadvantaged			
8. TYPE OF APPLICATION: <input checked="" type="checkbox"/> New <input type="checkbox"/> Resubmission <input type="checkbox"/> Renewal <input type="checkbox"/> Continuation <input type="checkbox"/> Revision		If Revision, mark appropriate box(es). <input type="checkbox"/> A. Increase Award <input type="checkbox"/> B. Decrease Award <input type="checkbox"/> C. Increase Duration <input type="checkbox"/> D. Decrease Duration <input type="checkbox"/> E. Other (specify): <input type="text"/>	
Is this application being submitted to other agencies? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> What other Agencies? <input type="text"/>			
9. NAME OF FEDERAL AGENCY: Office of Naval Research		10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: TITLE: <input type="text"/>	
11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT: Equity-Forward Workforce Development Pipeline for Naval STEM Superiority, White Paper Tracking Number 20-000000682			
12. PROPOSED PROJECT: Start Date 06/01/2021 Ending Date 05/31/2024		13. CONGRESSIONAL DISTRICT OF APPLICANT MO-005	

14. PROJECT DIRECTOR/PRINCIPAL INVESTIGATOR CONTACT INFORMATION

Prefix: First Name: Middle Name:

Last Name: Suffix:

Position/Title:

Organization Name:

Department: Division:

Street1:

Street2:

City: County / Parish:

State: Province:

Country: ZIP / Postal Code:

Phone Number: Fax Number:

Email:

15. ESTIMATED PROJECT FUNDING

a. Total Federal Funds Requested	<input type="text" value="758,280.00"/>
b. Total Non-Federal Funds	<input type="text" value="0.00"/>
c. Total Federal & Non-Federal Funds	<input type="text" value="758,280.00"/>
d. Estimated Program Income	<input type="text" value="0.00"/>

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES ☐ THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:

DATE:

b. NO ☒ PROGRAM IS NOT COVERED BY E.O. 12372; OR
☐ PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. By signing this application, I certify (1) to the statements contained in the list of certifications* and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances * and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)

☒ I agree

*The list of certifications and assurances, or an Internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

18. SFLLL (Disclosure of Lobbying Activities) or other Explanatory Documentation

19. Authorized Representative

Prefix: First Name: Middle Name:

Last Name: Suffix:

Position/Title:

Organization:

Department: Division:

Street1:

Street2:

City: County / Parish:

State: Province:

Country: ZIP / Postal Code:

Phone Number: Fax Number:

Email:

Signature of Authorized Representative

Lora J Owens

Date Signed

10/15/2020

20. Pre-application

21. Cover Letter Attachment

Anthony N. Caruso

250H Flarsheim Hall, 5110 Rockhill Rd, Department of Physics, Univ of Missouri – Kansas City,
Kansas City, MO 64110, 816.235.2505, carusoan@umkc.edu

Educational Background

Ph.D. Physics and Astronomy, University of Nebraska, Lincoln, NE	2004
M.S. Physics and Astronomy, University of Nebraska, Lincoln, NE	2003
B.A. Physics, B.A. Mathematics, Bethany College, Lindsborg, KS	2000

Employment

01/18 – present	Associate Vice Chancellor for Research, Univ. Missouri – Kansas City
09/14 – present	Professor of Electrical Engineering, University of Missouri – Kansas City
09/07 – present	Fellow of the Graduate and Doctoral Faculty, Univ. Missouri – KC
09/14 – 01/18	Assistant Vice Chancellor for Research, Univ. Missouri – Kansas City
09/14 – Present	Professor of Physics, University of Missouri – Kansas City
05/11 – 09/14	Associate Professor of Physics, University of Missouri – Kansas City
08/07 – 05/11	Assistant Professor of Physics, University of Missouri – Kansas City

Publication Record

Over 90 published articles (4 pending). Most recent publications include:

- “Review – Investigation and Review of the Thermal, Mechanical, Electrical, Optical, and Structural Properties of Atomic Layer Deposited High-k Dielectrics: Beryllium Oxide, Aluminum Oxide, Hafnium Oxide, and Aluminum Nitride,” *ECS J. Solid State Sci. Technol.*, 6(10), (2017), N189-N208. <https://doi.org/10.1149/2.0091710jss>.
- “Kernel Hilbert Space Template Matching Techniques for Simultaneous Determination of Neutron Source Location and Identity with a Volumetrically-Sensitive Moderating-Type Neutron Spectrometer”, *Nuc. Inst. Phys. Res. A*, 931, (2019), pp. 60-74. <https://doi.org/10.1016/j.nima.2019.03.076>.
- “Data fusion methods for improving resolution from a gamma-ray scintillator network”, *Nuc. Inst. Meth. Phys. Res. A*, 939, (2019), pp. 112-116. <https://doi.org/10.1016/j.nima.2019.04.102>.
- “Thermally Induced Phase Switching in Mechanically Biased Single Crystal Relaxors”, *Appl. Phys. Lett.*, 115, (2019), p. 252901. <https://doi.org/10.1063/1.5113723>.
- “Band offsets at amorphous hydrogenated boron nitride/high-k oxide interfaces from x-ray photoelectron spectroscopy with charging effects analysis”, *J. Vac. Sci. Tech. B*, 38, (2020), p. 030601. <https://doi.org/10.1116/6.0000005>.

Patents, co-Inventor

(2004) USPTO [6,774,013](#); (2008) USPTO [7,368,794](#); (2012) USPTO [8,237,161](#); (2014) USPTO [8,839,890](#); (2015) USPTO [9,081,100](#); (2017) USPTO [9,625,590](#); (2016) USPTO [9,465,120](#); (2018) USPTO [9,958,561](#); (2019) USPTO [10,301,719](#)

Funded Proposals: Since 2004, 37 awarded grants totaling \$41.7M.

2005 “Development of Ferromagnetic Materials Toward Spintronic Applications,” DARPA DSO, BAA05-19, \$450,000. Co-PI, Grant No. DMEA-90-02-2-0218.

2006 “A Direct Power Conversion Alphasoltaic Boron Carbide Diode Battery,” DARPA, BAA 06-25, MIPS: Micro Isotope Power Sources, Awarded PI \$3,551,944. Contract No. HR0011-06-C-0143.

- 2009** “²⁴⁴Cm Thermoelectric Demonstration,” Research Triangle Institute, Sub-awarded \$239,752.
- 2010** “High Efficiency Solid State Neutron Detector”, Office of Naval Research, Maritime-Weapons of Mass Destruction – Detection Program, Awarded PI \$293,722, Grant No. N00014-10-1-0419.
- 2010** “Understanding the Electronic Structure of the a-B₅C:H_x-to-Metal Interface,” DTRA BRCMWD, HDTRA1-08-10-BRCWMD-BAA, (period 4), Awarded PI \$198,736, Grant HDTRA1-10-1-0092. Continuation **2012-13** Awarded \$198,000. Continuation for **2014-15** \$100,000.
- 2010** “High Efficiency Solid State Neutron Detector”, Office of Naval Research, Maritime-Weapons of Mass Destruction – Detection Program, Awarded PI \$1,854,068, Grant No. N00014-1-11-0157.
- 2010** “High Efficiency Solid State Neutron Detector Demonstration”, Office of Naval Research, Maritime Weapons of Mass Destruction Detection Program, Code 351, Awarded PI \$1,498,000, Contract No. N00014-11-M-0041.
- 2012** “Prompt Neutron Spectrometry for Identification of Special Nuclear Materials (SNM) in Unknown Shielding Configurations”, Office of Naval Research – Young Investigator Program, Awarded PI \$675,434, Grant No. N00014-13-1-0402.
- 2015** “Urania-based Direct Conversion Neutron Detector”, DTRA, HDTRA-1-11-16-BRCWMD-BAA, UMKC sub-contract \$485,795, DTRA Award No. HDTRA-15-1-0072.
- 2016** “Tuning Solids for RF Transmission”, ONR Counter Directed Energy Weapons Program, Awarded PI \$700,000, ONR Award No. N00014-16-1-2067.
- 2016** “High Power Microwave Characterization Instrumentation For Solid-State Materials”, Defense University Research Instrumentation Program (DURIP), PA-AFRL-AFOSR-2015-0001, Awarded PI \$399,695, ONR Award No. N00014-16-1-2607.
- 2017** “RF Coupling Revisited”, Office of Naval Research, BAA N00014-17-S-B001, Awarded \$525,340, ONR Award No. N00014-17-1-2932.
- 2017** “Frequency-Agile, Solid-State, Photoconductive-Switch-Based HPRF Generator”, DOTC-17-01-INIT1558, Technology Sub-Objective: ENT-17-74 – Frequency and Waveform Agile HPRF Source Technology Demonstrators, Awarded sub-contract \$300,000). BAE Systems (Prime).
- 2017** “ONR Short Pulse Research, Evaluation and non-SWaP Demonstration for C-sUAV Study”, Office of Naval Research, BAA N00014-17-S-B001, Awarded PI \$7,483,067, ONR Award No. N00014-17-1-3016.
- 2018** “ONR Short Pulse Research, Evaluation and non-SWaP Demonstration for C-sUAV”, Office of Naval Research, BAA N00014-17-S-B001, Awarded \$7,724,334; Option IV \$3,367,569; Option VII \$7.9M; Option II \$200,000; Option III and IV, awarded for \$500,000; Option IV awarded for \$851,000, three options pending. ONR Contract No. N00014-18-C-1017.
- 2018** “Miniaturization of high average power, high peak power, wide bandwidth antennas”, Army Space and Missile Defense Command, SBIR Topic A164-123, Awarded Phase I and II, (Prime) Semiconductor Pulsed Technologies (Caruso), \$998,000, UMKC sub-contract \$222,000, Phase I Contract No. W9113M-17-C-0028; Phase II Contract No. N68335-19-C-0255.
- 2019** “Study of Soft Ferroelectric Materials for CDEW Applications”, Office of Naval Research, N00014-19-1-2597, Awarded PI 748,247.
- 2020** “Pulsed Tactical Effector for Regulated Attack (PTERA),” Office of Naval Research, BAA N00014-20-S-B001, Awarded \$8,200,000 FY2020-FY2025, contract pending.

Travis Fields

Associate Professor
Department of Civil and Mechanical Engineering
Flarsheim Hall 352
University of Missouri, Kansas City
Kansas City, MO 64110

Phone: (816) 235-1291
e-mail: fieldstd@umkc.edu

a. Professional Preparation

University of Nevada, Reno	Mechanical Engineering	B.S., 2008
University of Nevada, Reno	Mechanical Engineering	M.S., 2009
University of Nevada, Reno	Mechanical Engineering	Ph.D., 2013

b. Appointments

Associate Professor of Mechanical Engineering, UMKC (2019 – present)
Affiliate Director (UMKC), NASA Missouri Space Grant Consortium (2019 – present)
Assistant Professor of Mechanical Engineering, UMKC (2013 – 2019)

c. Products

1. Fields, T.D. and Sobester, A., Effective Geographically Dispersed Student Teams – a Teleoperated Systems Design Case Study, *AIAA Aerospace Sciences Meeting*, Kissimmee, FL, January 8-12, 2018.
2. Fields, T.D., Building a Mechatronics Design Course Around Quadcopters, *55th AIAA Aerospace Sciences Meeting*, Grapevine, TX, January 9-13, 2017.
3. Alabsi, M. and Fields, T.D., Unmanned Aircraft System Intelligent System Identification Experiment Design, *Part G: Journal of Aerospace Engineering*, Vol. 233, No. 13, 2019.
4. Alabsi, M. and Fields, T.D., Flight Controller Learning based on Real-Time Model Estimation of a Quadrotor Aircraft, *Part G: Journal of Aerospace Engineering*, August 2018.
5. Alabsi, M. and Fields, T.D., Real-Time Closed-Loop System Identification of a Quadcopter, *Journal of Aircraft*, Vol. 56, No. 1, 2019.
6. Kraft, T.E. and Fields, T.D., Feasibility of a Steerable Single-Actuator Cruciform Parachute for Targeted Aerial Delivery, *24th Aerodynamic Decelerator Systems Technology Conference and Seminar*, Denver, Colorado, June 5-9, 2017.
7. Fields, T.D., Ellis, L.M., and King, G.W., Quadrotor 6-DOF HIL Simulation and Verification Using a 6-axis Load Cell, *AIAA Atmospheric Flight Mechanics Conference*, Kissimmee, FL, January 4-9, 2015.
8. Herrington, S.M., Fields, T.D., and Yakimenko, O.A., Flight Performance of Steerable Cruciform Parachute Systems, *31st Congress of the International Council of Aeronautical Sciences*, Belo Horizonte, Brazil, September 9-14, 2018.
9. Herrington, S.M., Renzelman, J.T., Fields, T.D., and Yakimenko, O.A., Vertical Wind Tunnel Testing of Steerable Cruciform Parachute Systems, *Journal of Aircraft*, Vol. 56, No. 2, 2019.
10. Smith, A.J., Alabsi, M., and Fields, T.D., Heteroscedastic Gaussian Process-based System Identification and Predictive Control of a Quadcopter, *AIAA Atmospheric Flight Mechanics Conference*, Kissimmee, FL, January 8-12, 2018.

d. Synergistic Activities

- UMKC Undergraduate Research Advisory Council (2015 – present)
- Missouri NASA Space Grant Consortium UMKC Affiliate Director (2019-present)

Farid Nait-Abdesselam

Professor

CSEE Department, University of Missouri Kansas City
570-B Flarsheim Hall, 5100 Rockhill Rd, Kansas City, MO 64110

Office: 816-235-2335
Email: naf@umkc.edu

A. Professional Preparation

Bab-Ezzouar University, Algeria	Computer Science and Engineering	B.Sc – 1993
Paris Descartes University, France	Computer Science	M.Sc – 1994
Versailles University, France	Computer Science	D.Phil – 2000
University of Lille, France	Mathematics and Computer Science	HDR – 2009

B. Appointments

- 9/2019 – present: Professor, Department of Computer Science and Electrical Engineering, University of Missouri Kansas City, Kansas City, MO, USA.
- 4/2018 – 5/2019: Research Professor, Department of Electrical and Computer Engineering, Iowa State University, Ames, IA, USA.
- 9/2015 – 8/2016: Visiting Professor, Department of Electrical and Computer Engineering, Illinois Institute of Technology, Chicago, IL, USA.
- 9/2010 – 8/2019: Professor, Department of Computer Science, Paris Descartes University, Paris, France.
- 9/2003 – 8/2010: Associate Professor, Department of Computer Science, University of Lille, Lille, France.
- 9/2000 – 8/2003: Associate Professor, Department of Telecommunications, INSA of Lyon, Lyon France.
- 9/1999 – 8/2000: Assistant Professor, Department of Computer Science, University of Lille, Lille, France.
- 1/1998 – 12/1998: Visiting Research Associate, Department of Electrical and Computer Engineering, University of Western Ontario, London Ontario, Canada.

C. Products

(i) Most closely related products

1. Y. Tseng, F. Nait-Abdesselam and A. Khokhar. A Comprehensive 3D Security Analysis of a Controller in Software Defined Networking. Wiley International Journal of Security and Privacy, Wiley. Vol. 1, Issue 2 March/April (2018).
2. Y. Tseng, F. Nait-Abdesselam, and Ashfaq Khokhar. SENAD: Securing Network Application Deployment in Software Defined Networks. IEEE International Conference on Communications (ICC) (2018).
3. Y. Tseng, M. Pattaranantakul, R. He, Z. Zhang, F. Nait-Abdesselam. Controller DAC: Securing SDN Controller with Dynamic Access Control. IEEE International Conference on Communications (ICC) (2017).
4. Z. Zhang, F. Naït-Abdesselam, P-H. Ho, Y. Kadobayashi. Toward cost-sensitive self-optimizing anomaly detection and response in autonomic networks. Elsevier Computers Security 30(6-7): 525-537 (2011).
5. S. Djahel, Y. Begriche, F. Naït-Abdesselam. A Bayesian Statistical Model to Alleviate Greediness in Wireless Mesh Networks. IEEE GLOBECOM 2010.

(ii) Other significant products

1. C. Titouna, F. Naït-Abdesselam and A. Khokhar. DODS: A Distributed Outlier Detection Scheme for Wireless Sensor Networks. Elsevier Computer Networks, Volume 161, Pages 93-101, 2019.
2. F. Almasalha, F. Naït-Abdesselam, G. Trajcevski and A. Khokhar. Secure transmission of multimedia contents over low-power mobile devices. Elsevier Journal of Information Security and Applications 40, 183-192, April 2018.
3. Z. Zhang, F. Nait-Abdesselam and P.-H. Ho. Boosting Markov Reward Models for Probabilistic Security Evaluation by Characterizing Behaviors of Attacker and Defender. In Proc. of International Conference on Availability, Reliability and Security (ARES 2008), Barcelona, Spain, March 4-7, 2008.
4. A. Fadlallah, A. Serhrouchni, Y. Begriche and F. Nait-Abdesselam. A Hybrid Messaging-Based Scheme for IP Traceback. In 3rd International Conference on Information and Communication Technologies: From Theory to Applications (IEEE ICTTA), Damascus, Syria, April 2008.
5. R. Saad, F. Nait-Abdesselam and A. Serhrouchni. A Collaborative Peer-to-Peer Architecture to Defend Against DDoS Attacks. In Proc. 33rd Annual IEEE Conference on Local Computer Networks (IEEE LCN), Montreal, Canada, October 14-17, 2008.

D. Synergistic Activities

- Editor in Chief, International Journal of Network Science, Inderscience (2018 – present).
- Associate Editor for multiple journals: Security and Privacy (Wiley, 2017 – present), International Journal of Communication Systems (Wiley, 2008 – present), International Journal of Internet Protocol Technology (Inderscience, 2008–present), International Journal of Ad Hoc and Ubiquitous Computing (Inderscience, 2010–present), International Journal of Space-Based and Situated Computing (Inderscience, 2010–present), International Journal of Communication Networks and Distributed Systems (Inderscience, 2011–present).
- Symposium Co-Chair, Wireless and Mobile Networking, IEEE ICC, 2010.
- Guest Co-Editor, Wireless Communications and Mobile Computing, Special Issue on Architectures and Protocols for Wireless Mesh, Ad Hoc, and Sensor Networks, Wiley, 2010.
- TPC member of major conferences: ICC, GLOBECOM, WCNC, PDPS, . . .
- Reviewer to many IEEE and ACM journals.

Biographical Sketch
Zhu Li, PHD
University of Missouri-Kansas City

A. PROFESSIONAL PREPARATION

Sichuan University , Chengdu (China)	Computer Science	BS, 1992/07
University of Louisiana at Lafayette	Computer Science	MS, 1997/12
Northwestern University , Evanston	Electrical & Computer Engineering	PhD, 2004/06

B. APPOINTMENTS

Aug 2015- present	Associate Professor, Dept of Computer Science & Electrical Engineering, University of Missouri, Kansas City (UMKC)
Jun 2018 – Aug 2018	AFRL Visiting Faculty, Center for Unmanned Aerial System Research, US Air Force Academy (USAFA)
Jun 2017 – Aug 2017	AFRL Visiting Faculty, Center for Unmanned Aerial System Research, US Air Force Academy (USAFA)
Jun 2016 – Aug 2016	AFRL Visiting Faculty, Center for Cyber Warfare Research, US Air Force Academy (USAFA)
Jul 2012 – Aug 2015	Sr. Staff Researcher/Sr. Manager, Multimedia Standards Research Lab, Samsung Research America , Richardson, TX
Sep 2010- Jul 2012 NJ.	Sr. Staff Researcher, Media Lab, FutureWei Technology USA , Bridgewater,
Apr 2008 – Sep 2010	Assistant Professor - Department of Computing, Hong Kong Polytechnic University , Hong Kong.
Jan 2000 – Mar 2008	Senior, Senior Staff and Principal Staff Research Engineer, Multimedia Research Lab, Motorola Labs , Schaumburg, IL.

C. PUBLICATIONS

i) Five Publications Related to the Project

- R. Hang, **Z. Li**, P. Ghamisi, D. Hong, G. Xia and Q. Liu, "Classification of Hyperspectral and LiDAR Data Using Coupled CNNs", *IEEE Trans. on Geoscience & Remote Sensing (TGRS)*, 2020.
- L. Li, **Z. Li**, S. Liu, H. Li, "Occupancy-map-based Rate Distortion Optimization and Partition for Video-based Point Cloud Compression", *IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)*, 2020.
- L. Li, N. Yan, **Z. Li**, S. Liu, H. Li, " λ -domain Perceptual Rate Control for 360-degree Video Compression", *IEEE Journal of Selected Topics in Signal Processing*, 2020.
- L. Li, **Z. Li**, B. Li, D. Liu, and H. Li, "Pseudo sequence based 2-D hierarchical coding structure for light-field image compression", *IEEE Journal of Selected Topics in Signal Processing*, Special Issue on Light Field, 2017.
- Li Li, Zhu Li, Vladyslav Zakharchenko, Jianle Chen, Houqiang Li, "Advanced 3D Motion Prediction for Video Based Dynamic Point Cloud Compression", *IEEE Trans on Image Processing*, 2019.

ii) Five Other Significant Publications

- L. Li, **Z. Li**, B. Li, D. Liu, H. Li, "Quadtree-based Coding Framework for High Density Camera Array based Light Field Image", *IEEE Trans on Circuits and Systems for Video Technology*, 2019.
- Z. Zhang, L. Li, **Z. Li**, and H. Li, "Mobile Visual Search Compression with Grassmann Manifold Embedding", *IEEE Trans on Circuits & Sys for Video Tech.*, 2018.

- R. Hang, **Z. Li**, Q. Liu, P. Ghamisi and S. Bhattacharyya, "Hyperspectral Image Classification with Attention Aided CNNs", to appear, *IEEE Trans. on Geoscience & Remote Sensing*, 2020.
- Y. Li, L. Li, D. Li, H. Li, **Z. Li**, and F. Wu, "Learning a Convolutional Neural Network for Image Compact Resolution", *IEEE Trans on Image Processing*, 2018.
- Li Li, **Zhu Li**, Xiang Ma, Haitao Yang and Houqiang Li, "Advanced Spherical Motion Model and Local Padding for 360 Video Compression", *IEEE Transactions on Image Processing* vol. 28, no. 5, pp. 2342-2356, May 2019.

D. SYNERGISTIC ACTIVITIES

1. **Editorial Activities:** Associate Editor-in-Chief, *IEEE Trans on Circuits & Sys for Video Tech*, 2020~, Associate Editor, *IEEE Trans on Image Processing*, 2019~, *IEEE Transaction on Multimedia*, 2015~19, *IEEE Transaction on Circuits & System for Video Technology*, 2016~19, Associate Editor, *Journal of Signal Processing Systems* (Springer), 2015~.
2. **Grant Review for:** NSF CNS, NSF CAREER, AFOSR YIP
3. **Professional Services:** IEEE Senior Member (since 2007); Steering Committee, IEEE Int'l Conf on Multimedia & Expo (ICME), 2016~18. IEEE Multimedia Signal Processing Technical Committee (MMSP), 2014-17, 2017-20; Steering Chair, IEEE Multimedia Communication Technical Committee (MMTC), 2016-18; *TPC Co-Chair*, IEEE Int'l Conf on Multimedia & Expo (ICME), Shanghai, 2019; *General Co-Chair*, IEEE Visual Communication & Image Processing (VCIP), 2017, St. Petes, FL; *Area Chair* for, IEEE Int'l Conf on Image Processing (ICIP), 2015,2016, 2017, IEEE Int'l Conf on Multimedia & Expo (ICME) 2015,2016, Special Session Chair 2017; IEEE Visual Communication & Image Processing (VCIP), 2015, 2016;
4. **Reviewers for:** IEEE Trans on Image Processing, IEEE Trans on Multimedia, IEEE Trans on Pattern Analysis & Machine Intelligence, IEEE Trans on Circuits & System for Video Tech, IEEE Trans. On Networking (T-NET), IEEE Trans. on Information Forensic and Security (T-IFS), IEEE Trans. on Parallel and Distributed Systems (T-PDS), IEEE Journal on Selected Area in Communication (J-SAC), IEEE Communication Magazine.
5. **Courses Development and Educational Training:** Development of 4 graduate level courses: *ECE 484 Digital Image Processing*, *ECE 5582 Computer Vision*, *ECE 5578 Multimedia Communication*; *ECE 5900 Advanced Multimedia Communication*.
6. **Patents:** 46 issued and pending.

CURRENT & PENDING SUPPORT

Dr Anthony Caruso

"Equity-Forward Workforce Development Pipeline for Naval STEM Superiority"

Title of Application & Summary	Source & Amount of Funding	Percentage Effort Devoted to Each Project	Identify Prime Applicants and Complete List of Sub-Awards, If Applicable	Technical Contact (Name/Address/Phone/Email)	Period of Performance	Current/Pending	Related to Proposed Effort/Degree of Overlap
"High Rep-Rate Photoconductive Silicon Switches"; Solid-State, High Power Microwave, Directed Energy Solutions	Office of Naval Research (b) (4)	3.0%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	February 18, 2015 - Ongoing (Phase II Option I and Option II funded)	Current	Yes - ONR Project
"RF Coupling Revisited"; Directed Energy Effects	Office of Naval Research (b) (4)	3%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	October 1, 2017 - December 31, 2020	Current	Yes - ONR Project
"ONR Short Pulse Research, Evaluation and non-Swap Demonstration for C-sUAV Study"; Solid-State, High Power Microwave, Directed Energy and Effects on UAVs - grant	Office of Naval Research, (b) (4)	10%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	December 1, 2017 - November 30, 2021	Current	Yes - ONR Project
"ONR Short Pulse Research, Evaluation and non-Swap Demonstration for C-sUAV"; Solid-State, High Power Microwave, Directed Energy and Effects on UAVs	Office of Naval Research, (b) (4)	15%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	September 1, 2017 - Ongoing (Three Options Pending)	Current	Yes - ONR Project
"Miniaturization of High Average Power, High Peak Power, Wide Bandwidth Antennas"; Solid-State, High Power Microwave, Directed Energy Solutions	Army Space and Missile Defense Command (b) (4)	5%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	March 7, 2019 - October 16, 2020	Current	Yes - DoD Project
"Study of Soft Ferroelectric Materials for CDEW Applications"; Counter Directed Energy	Office of Naval Research (b) (4)	5%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	August 1, 2019 - July 31, 2022	Current	Yes - ONR Project
"Compact Source for Focus and Tunable Narrowband Radio Frequency"; High Power Narrowband RF Generation	Naval Air Systems Command, (b) (4)	3%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	June 1, 2020 - May 31, 2021	Current	Yes - DoN Project
"Pulsed Tactical Effector for Regulated Attack (PTERA)"	Office of Naval Research, (b) (4)	10%	UMKC, Anthony Caruso, PI	Anthony Caruso; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2505; carusoan@umkc.edu	Jan 1, 2021 - Dec 31, 2026	Pending	Yes - ONR Project
"Equity Forward Workforce Development Pipeline for Naval STEM Superiority"; STEM Education	Office of Naval Research (b) (4)	4.3%	UMKC Daniel McIntosh PI	Daniel McIntosh; 5110 Rockhill Road, Kansas City, MO 64110; 816-235-5324; mcintoshdh@umkc.edu	6/1/21 - 5/31/2024	Pending	N/A

CURRENT & PENDING SUPPORT

Dr. Travis Fields

"STEM Workforce Development and Internship Pipeline at UMKC"

Title of Application & Summary	Source & Amount of Funding	Percentage Effort Devoted to Each Project	Identify Prime Applicants and Complete List of Sub-Awards, If Applicable	Technical Contact (Name/Address/Phone/E-mail)	Period of Performance	Current/Pending	Related to Proposed Effort/Degree of Overlap
NASA Opportunities in NASA STEM FY2020-2024	NASA Space Grant (b) (4)	5%	UMKC, Travis Fields PI	Travis Fields/5110 Rockhill FH 352, Kansas City, MO 64064, 816-235-1291, fieldstd@umkc.edu	5/1/20-4/30/23	Current	Minimal Overlap
Unmanned Aircraft Autonomous Pursuit via Proportional Navigation	Naval Postgraduate School (b) (4)	8%	UMKC, Travis Fields PI	Travis Fields/5110 Rockhill FH 352, Kansas City, MO 64064, 816-235-1291, fieldstd@umkc.edu	8/15/19 - 12/31/20	Current	Not Related, No Overlap
Material Processing and Automation Partnership with IMP	IMP LLC	2%	UMKC Travis Fields PI	Travis Fields/5110 Rockhill FH 352, Kansas City, MO 64064, 816-235-1291 fieldstd@umkc.edu	8/1/20 - 12/31/20	Current	Not Related, No Overlap
Advancing Steerable Low-Cost Precision Aerial Delivery Systems	U.S. Army Natick Solder Research Development Engineering Center (b) (4)	8%	UMKC, Travis Fields PI	Travis Fields/5110 Rockhill FH 352, Kansas City, MO 64064, 816-235-1291, fieldstd@umkc.edu	1/1/18 - 12/31/20	Current	Yes - DoD Project
Short Pulse Research, Evaluation, and non-SWaP Demonstration for C-sUAV	Office of Naval Research (b) (4)	11%	UMKC, Anthony Caruso PI; Travis Fields Co-PI	Anthony Caruso/5110 Rockhill Rd, Kansas City, MO, 816-235-2505, carusoan@umkc.edu	3/7/18 - 3/7/22	Current	Yes - ONR Project
ONR Short Pulse Research, Evaluation and non-SWaP Demonstration for sUAV Study	Office of Naval Research (b) (4)	11%	UMKC, Anthony Caruso PI; Travis Fields Co-PI	Anthony Caruso/5110 Rockhill Rd, Kansas City, MO, 816-235-2505, carusoan@umkc.edu	10/1/17 - 9/31/21	Current	Yes - ONR Project
UAV Engagement Strategy, Effects Analysis and Forensics	Booze Allen Hamilton	8.3%	UMKC Travis Fields PI	Travis Fields/5110 Rockhill FH 352, Kansas City, MO 64064, 816-235-1291 fieldstd@umkc.edu	11/1/20 - 10/31/21	Pending	Not Related, No Overlap
Equity Forward Workforce Development Pipeline for Naval STEM Superiority STEM Education	Office of Naval Research (b) (4)	4.3%	UMKC Daniel McIntosh PI	Rockhill Road, Kansas City, MO 64110; 816-235-5324; mcintoshdh@umkc.edu	6/1/21 - 5/31/2024	Pending	N/A

CURRENT & PENDING SUPPORT

Dr. Farid Nait-Abdesselam

"Equity Forward Workforce Development Pipeline for Naval STEM Superiority"

Title of Application & Summary	Source & Amount of Funding	Percentage Effort Devoted to Each Project	Identify Prime Applicants and Complete List of Sub-Awards, If Applicable	Technical Contact (Name/Address/Phone/Email)	Period of Performance	Current/Pending	Related/Degree Overlap
"Equity Forward Workforce Development Pipeline for Naval STEM Superiority"; STEM Education	Office of Naval Research, (b) (4)	8.3%	UMKC, Daniel McIntosh, PI	Daniel McIntosh; 5110 Rockhill Road, Kansas City, MO 64110; 816-235-5324; mcintoshdh@umkc.edu	6/1/21 - 5/31/2024	Pending	N/A
Telehealth Platform for Anxiety and Depression Management in Pakistani Elderly Population	NIH	20%	UMKC, Farid Nait-Abdesselam, PI	Farid Nait-Abdesselam; 5110 Rockhill Road, Kansas City, MO 64110; 816-235-2335; naf@umkc.edu	7/1/21 - 6/30/26	Pending	Not Related, No Overlap

CURRENT & PENDING SUPPORT

Dr Zhu Li

"Equity-Forward Workforce Development Pipeline for Naval STEM Superiority"

Title of Application & Summary	Source & Amount of Funding	Percentage Effort Devoted to Each Project	Identify Prime Applicants and Complete List of Sub-Awards, If Applicable	Technical Contact (Name/Address/Phone/Email)	Period of Performance	Current/Pending	Related to Proposed Effort/Degree of Overlap
CNS 1747751 Phase I UCRC UMKC: Center for Big Learning (CBL)	National Science Foundation, (b) (4)	11.0%	UMKC, Zhu Li PI	Zhu Li; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2346; lizhu@umkc.edu	Feb 1, 2018 - March 1, 2023	Current	Yes - Center for Big Learning
Dynamic, Data-Driven Design Methodologies for IoT-Based Computer Vision Systems	AFOSR, (b) (4)	44%	University of Maryland, Shuvra Bhattacharyya PI; Zhu Li Co-PI	Zhu Li; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2346; lizhu@umkc.edu	Jan 1, 2018 - Dec 31, 2022	Current	Yes - DoD project
Unlocking the Mysteries of a Medieval Chant Book with Multispectral Imaging	National Endowment for the Humanities (b) (4)	25%	UMKC, Jeff Rydberg-Cox, PI; Zhu Li Co PI	Jeff Rydberg-Cox; 5100 Rockhill Road, Kansas City, MO 64110; 816-235-2765; rydbergcoxj@umkc.edu	Jan 1, 2021 - Jan 14, 2023	Current	Not Related, No Overlap
Equity Forward Workforce Development Pipeline for Naval STEM Superiority; STEM Education	Office of Naval Research (b) (4)	4.30%	UMKC, Daniel McIntosh, PI	Daniel McIntosh; 5110 Rockhill Road, Kansas City, MO 64110; 816-235-5324; mcintoshdlh@umkc.edu	6/1/21 - 5/31/2024	Pending	N/A

RESEARCH & RELATED Other Project Information

OMB Number: 4040-0001
Expiration Date: 12/31/2022

1. Are Human Subjects Involved? ☒ Yes ☐ No

1.a. If YES to Human Subjects

Is the Project Exempt from Federal regulations? ☐ Yes ☒ No

If yes, check appropriate exemption number. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8

If no, is the IRB review Pending? ☒ Yes ☐ No

IRB Approval Date:

Human Subject Assurance Number:

2. Are Vertebrate Animals Used? ☐ Yes ☒ No

2.a. If YES to Vertebrate Animals

Is the IACUC review Pending? ☐ Yes ☐ No

IACUC Approval Date:

Animal Welfare Assurance Number:

3. Is proprietary/privileged information included in the application? ☐ Yes ☒ No

4.a. Does this Project Have an Actual or Potential Impact - positive or negative - on the environment? ☐ Yes ☒ No

4.b. If yes, please explain:

4.c. If this project has an actual or potential impact on the environment, has an exemption been authorized or an environmental assessment (EA) or environmental impact statement (EIS) been performed? ☐ Yes ☐ No

4.d. If yes, please explain:

5. Is the research performance site designated, or eligible to be designated, as a historic place? ☐ Yes ☒ No

5.a. If yes, please explain:

6. Does this project involve activities outside of the United States or partnerships with international collaborators? ☐ Yes ☒ No

6.a. If yes, identify countries:

6.b. Optional Explanation:

7. Project Summary/Abstract

8. Project Narrative

9. Bibliography & References Cited

10. Facilities & Other Resources

11. Equipment

12. Other Attachments ☐

Project Abstract

The Project Abstract must not exceed one page and must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained description of the project and should contain a statement of objectives and methods to be employed. It should be informative to other persons working in the same or related fields and insofar as possible understandable to a technically literate lay reader. This Abstract must not include any proprietary/confidential information.

* Please click the add attachment button to complete this entry.

Add Attachment

Delete Attachment

View Attachment

1247-Abstract.pdf

RESEARCH & RELATED BUDGET - Budget Period 1

OMB Number: 4040-0001
Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 0109896190000

Enter name of Organization: Curators of the University of Missouri on behalf of UMKC

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 1

Start Date: 06/01/2021

End Date: 05/31/2022

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Cal.	Months Acad.	Sum.	Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
Dr.	Daniel		McIntosh						(b) (4)		11,284.00
Project Role: PD/PI											
Dr.	Anthony		Caruso								6,120.00
Project Role: Co-PI											
Dr.	Travis		Fields								6,120.00
Project Role: Co-PI											
Dr.	Zhu		Li								6,120.00
Project Role: Co-PI											
Dr.	Farid		Nait- Abdesselam								6,120.00
Project Role: Co-PI											
Dr.	Karin		Chang								7,140.00
Project Role: Co-PI											
Dr.	Alexis		Petri								1,360.00
Project Role: Co-PI											

Additional Senior Key Persons:

Add Attachment

Delete Attachment

View Attachment

Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

44,264.00

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
		Cal.	Acad.	Sum.			
	Post Doctoral Associates						
5	Graduate Students					(b) (4)	28,080.00
5	Undergraduate Students						52,780.00
1	Secretarial/Clerical						10,184.00
1	Evaluation Support						12,860.00
12	Total Number Other Personnel					Total Other Personnel	103,904.00
Total Salary, Wages and Fringe Benefits (A+B)							(b) (4)

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item

Funds Requested (\$)

Additional Equipment:

Add Attachment

Delete Attachment

View Attachment

Total funds requested for all equipment listed in the attached file

Total Equipment

D. Travel

1. Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)

2. Foreign Travel Costs

Total Travel Cost

E. Participant/Trainee Support Costs

1. Tuition/Fees/Health Insurance

19,536.00

2. Stipends

3. Travel

4. Subsistence

5. Other

20 Number of Participants/Trainees

Total Participant/Trainee Support Costs

19,536.00

F. Other Direct Costs

	Funds Requested (\$)
1. Materials and Supplies	
2. Publication Costs	
3. Consultant Services	
4. ADP/Computer Services	
5. Subawards/Consortium/Contractual Costs	
6. Equipment or Facility Rental/User Fees	
7. Alterations and Renovations	
8. <input type="text"/>	
9. <input type="text"/>	
10. <input type="text"/>	
Total Other Direct Costs	

G. Direct Costs

Funds Requested (\$)
Total Direct Costs (A thru F) 167,704.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
F&A	(b) (4)		(b) (4)
Total Indirect Costs			(b) (4)

Cognizant Federal Agency
(Agency Name, POC Name, and
POC Phone Number)

DHHS

I. Total Direct and Indirect Costs

Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H) 249,196.00

J. Fee

Funds Requested (\$)

K. Total Costs and Fee

Funds Requested (\$)
Total Costs and Fee (I + J) 249,196.00

L. Budget Justification

(Only attach one file.)

1246-Budget Justification.pdf

Add Attachment

Delete Attachment

View Attachment

RESEARCH & RELATED BUDGET - Budget Period 2

OMB Number: 4040-0001
Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 0109896190000

Enter name of Organization: Curators of the University of Missouri on behalf of UMKC

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 2

Start Date: 06/01/2022

End Date: 05/31/2023

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Cal.	Months Acad.	Sum.	Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)	
Dr.	Daniel		McIntosh						(b) (4)		11,424.00	
Project Role: PD/PI												
Dr.	Anthony		Caruso								5,440.00	
Project Role: Co-PI												
Dr.	Travis		Fields								5,440.00	
Project Role: Co-PI												
Dr.	Zhu		Li								5,440.00	
Project Role: Co-PI												
Dr.	Farid		Nait- Abdesselam								5,440.00	
Project Role: Co-PI												
Dr.	Karin		Chang								7,140.00	
Project Role: Co-PI												
Dr.	Alexis		Petri								680.00	
Project Role: Co-PI												

Additional Senior Key Persons:

Add Attachment

Delete Attachment

View Attachment

Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

41,004.00

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
		Cal.	Acad.	Sum.			
	Post Doctoral Associates						
5	Graduate Students					(b) (4)	15,600.00
5	Undergraduate Students						59,280.00
1	Secretarial/Clerical						10,388.00
1	Evaluation Support						12,860.00
12	Total Number Other Personnel					Total Other Personnel	98,128.00
Total Salary, Wages and Fringe Benefits (A+B)							(b) (4)

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)
<div></div>	<div></div>
Additional Equipment:	<div></div>
	<div>Add Attachment</div>
	<div>Delete Attachment</div>
	<div>View Attachment</div>
Total funds requested for all equipment listed in the attached file	<div></div>
Total Equipment	<div></div>

D. Travel

	Funds Requested (\$)
1. Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	<div></div>
2. Foreign Travel Costs	<div></div>
Total Travel Cost	<div></div>

E. Participant/Trainee Support Costs

	Funds Requested (\$)
1. Tuition/Fees/Health Insurance	<div>33,770.00</div>
2. Stipends	<div></div>
3. Travel	<div></div>
4. Subsistence	<div></div>
5. Other	<div></div>
35 Number of Participants/Trainees	Total Participant/Trainee Support Costs
	<div>33,770.00</div>

F. Other Direct Costs

	Funds Requested (\$)
1. Materials and Supplies	
2. Publication Costs	
3. Consultant Services	
4. ADP/Computer Services	
5. Subawards/Consortium/Contractual Costs	
6. Equipment or Facility Rental/User Fees	
7. Alterations and Renovations	
8. <input type="text"/>	
9. <input type="text"/>	
10. <input type="text"/>	
Total Other Direct Costs	

G. Direct Costs

Funds Requested (\$)
Total Direct Costs (A thru F) 172,902.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
F&A	(b) (4)		(b) (4)
Total Indirect Costs			(b) (4)

Cognizant Federal Agency
(Agency Name, POC Name, and
POC Phone Number)

DHHS

I. Total Direct and Indirect Costs

Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H) 249,424.00

J. Fee

Funds Requested (\$)

K. Total Costs and Fee

Funds Requested (\$)
Total Costs and Fee (I + J) 249,424.00

L. Budget Justification

(Only attach one file.)

1246-Budget Justification.pdf

Add Attachment

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RESEARCH & RELATED BUDGET - Budget Period 3

OMB Number: 4040-0001
Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS:

0109896190000

Enter name of Organization:

Curators of the University of Missouri on behalf of UMKC

Budget Type: ☒ Project☐ Subaward/Consortium

Budget Period: 3

Start Date: 06/01/2023

End Date: 05/31/2024

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Cal.	Months	Acad.	Sum.	Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
Dr.	Daniel		McIntosh							(b) (4)		11,565.00
Project Role: PD/PI												
Dr.	Anthony		Caruso									5,440.00
Project Role: Co-PI												
Dr.	Travis		Fields									5,440.00
Project Role: Co-PI												
Dr.	Zhu		Li									5,440.00
Project Role: Co-PI												
Dr.	Farid		Nait-Abdesselam									5,440.00
Project Role: Co-PI												
Dr.	Karin		Chang									7,140.00
Project Role: Co-PI												

Additional Senior Key Persons:

Add Attachment

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View Attachment

Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

40,465.00

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
		Cal.	Acad.	Sum.			
	Post Doctoral Associates						
5	Graduate Students						15,600.00
5	Undergraduate Students						65,780.00
1	Secretarial/Clerical						10,596.00
1	Evaluation Support						12,860.00
12	Total Number Other Personnel					Total Other Personnel	104,836.00
Total Salary, Wages and Fringe Benefits (A+B)							(b) (4)

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)
Additional Equipment:	<div>Add AttachmentDelete AttachmentView Attachment</div>
Total funds requested for all equipment listed in the attached file	
Total Equipment	

D. Travel

	Funds Requested (\$)
1. Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	
2. Foreign Travel Costs	
Total Travel Cost	

E. Participant/Trainee Support Costs

	Funds Requested (\$)
1. Tuition/Fees/Health Insurance	34,446.00
2. Stipends	
3. Travel	
4. Subsistence	
5. Other	
20 Number of Participants/Trainees	Total Participant/Trainee Support Costs
	34,446.00

F. Other Direct Costs

		Funds Requested (\$)
1.	Materials and Supplies	
2.	Publication Costs	
3.	Consultant Services	
4.	ADP/Computer Services	
5.	Subawards/Consortium/Contractual Costs	
6.	Equipment or Facility Rental/User Fees	
7.	Alterations and Renovations	
8.		
9.		
10.		
Total Other Direct Costs		

G. Direct Costs

	Funds Requested (\$)
Total Direct Costs (A thru F)	179,747.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
F&A	(b) (4)		(b) (4)
Total Indirect Costs			(b) (4)

Cognizant Federal Agency
(Agency Name, POC Name, and
POC Phone Number)

DHHS

I. Total Direct and Indirect Costs

	Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H)	259,662.00

J. Fee

Funds Requested (\$)

K. Total Costs and Fee

	Funds Requested (\$)
Total Costs and Fee (I + J)	259,662.00

L. Budget Justification

(Only attach one file.)

1246-Budget Justification.pdf

Add Attachment

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RESEARCH & RELATED BUDGET - Cumulative Budget

		Totals (\$)
Section A, Senior/Key Person		125,733.00
Section B, Other Personnel		306,868.00
Total Number Other Personnel	36	
Total Salary, Wages and Fringe Benefits (A+B)		432,601.00
Section C, Equipment		
Section D, Travel		
1. Domestic		
2. Foreign		
Section E, Participant/Trainee Support Costs		87,752.00
1. Tuition/Fees/Health Insurance	87,752.00	
2. Stipends		
3. Travel		
4. Subsistence		
5. Other		
6. Number of Participants/Trainees	75	
Section F, Other Direct Costs		
1. Materials and Supplies		
2. Publication Costs		
3. Consultant Services		
4. ADP/Computer Services		
5. Subawards/Consortium/Contractual Costs		
6. Equipment or Facility Rental/User Fees		
7. Alterations and Renovations		
8. Other 1		
9. Other 2		
10. Other 3		
Section G, Direct Costs (A thru F)		520,353.00
Section H, Indirect Costs		(b) (4)
Section I, Total Direct and Indirect Costs (G + H)		758,282.00
Section J, Fee		
Section K, Total Costs and Fee (I + J)		758,282.00

RESEARCH & RELATED Senior/Key Person Profile (Expanded)

PROFILE - Project Director/Principal Investigator			
Prefix:	Dr.	* First Name:	Daniel
		Middle Name:	
* Last Name:	McIntosh	Suffix:	
Position/Title:	Assoc Prof, Chair, & Director STEM Education	Department:	Physics & Astronomy
Organization Name:	Curators of the University of Missouri on behalf of UMKC	Division:	
* Street1:	5100 Rockhill Road		
Street2:			
* City:	Kansas City	County/ Parish:	
* State:	MO: Missouri	Province:	
* Country:	USA: UNITED STATES	* Zip / Postal Code:	64110-2499
* Phone Number:	816-235-5324	Fax Number:	
* E-Mail:	mcintoshdh@umkc.edu		
Credential, e.g., agency login:			
* Project Role:	PD/PI	Other Project Role Category:	
Degree Type:			
Degree Year:			
* Attach Biographical Sketch	1236-McIntosh Biosketch.pdf	Add Attachment	Delete Attachment View Attachment
Attach Current & Pending Support	1237-McIntosh C&P.pdf	Add Attachment	Delete Attachment View Attachment

PROFILE - Senior/Key Person 1			
Prefix:	Dr.	* First Name:	Anthony
		Middle Name:	
* Last Name:	Caruso	Suffix:	
Position/Title:	Curators' Professor of Physics	Department:	
Organization Name:		Division:	
* Street1:	5100 Rockhill Road		
Street2:			
* City:	Kansas City	County/ Parish:	
* State:	MO: Missouri	Province:	
* Country:	USA: UNITED STATES	* Zip / Postal Code:	64110-2499
* Phone Number:	816-235-2505	Fax Number:	
* E-Mail:	carusoan@umkc.edu		
Credential, e.g., agency login:			
* Project Role:	Co-PD/PI	Other Project Role Category:	
Degree Type:			
Degree Year:			
Attach Biographical Sketch	1238-Caruso Biosketch.pdf	Add Attachment	Delete Attachment View Attachment
Attach Current & Pending Support	1239-Caruso C&P.pdf	Add Attachment	Delete Attachment View Attachment

RESEARCH & RELATED Senior/Key Person Profile (Expanded)

PROFILE - Senior/Key Person 2			
Prefix:	Dr.	* First Name:	Travis
Middle Name:			
* Last Name:	Fields	Suffix:	
Position/Title:	Associate Professor of Mechanical Engineering	Department:	
Organization Name:			Division:
* Street1:	5100 Rockhill Road		
Street2:			
* City:	Kansas City	County/ Parish:	
* State:	MO: Missouri	Province:	
* Country:	USA: UNITED STATES	* Zip / Postal Code:	64110-2499
* Phone Number:	816-235-1291	Fax Number:	
* E-Mail:	fieldstd@umkc.edu		
Credential, e.g., agency login:			
* Project Role:	Co-PD/PI	Other Project Role Category:	
Degree Type:			
Degree Year:			
Attach Biographical Sketch	1240-Fields Biosketch.pdf	Add Attachment	Delete Attachment View Attachment
Attach Current & Pending Support	1241-Fields C&P.pdf	Add Attachment	Delete Attachment View Attachment

PROFILE - Senior/Key Person 3			
Prefix:	Dr.	* First Name:	Farid
Middle Name:			
* Last Name:	Nait-Abdesselam	Suffix:	
Position/Title:	Professor Computer Science & Electrical Eng	Department:	
Organization Name:			Division:
* Street1:	5100 Rockhill Road		
Street2:			
* City:	Kansas City	County/ Parish:	
* State:	MO: Missouri	Province:	
* Country:	USA: UNITED STATES	* Zip / Postal Code:	64110-2499
* Phone Number:	816-235-2335	Fax Number:	
* E-Mail:	naf@umkc.edu		
Credential, e.g., agency login:			
* Project Role:	Co-PD/PI	Other Project Role Category:	
Degree Type:			
Degree Year:			
Attach Biographical Sketch	1242-Nait-Abdesselam Biosket	Add Attachment	Delete Attachment View Attachment
Attach Current & Pending Support	1243-Nait-Abdesselam C&P.pdf	Add Attachment	Delete Attachment View Attachment

RESEARCH & RELATED Senior/Key Person Profile (Expanded)

PROFILE - Senior/Key Person 4			
Prefix:	Dr.	* First Name:	Zhu
		Middle Name:	
* Last Name:	Li	Suffix:	
Position/Title:	Associate Professor Computer Science & EE	Department:	
Organization Name:		Division:	
* Street1:	5100 Rockhill Road		
Street2:			
* City:	Kansas City	County/ Parish:	
* State:	MO: Missouri	Province:	
* Country:	USA: UNITED STATES	* Zip / Postal Code:	64110-2499
* Phone Number:	816-235-2346	Fax Number:	
* E-Mail:	lizhu@umkc.edu		
Credential, e.g., agency login:			
* Project Role:	Co-PD/PI	Other Project Role Category:	
Degree Type:			
Degree Year:			
Attach Biographical Sketch	1244-Li Biosketch.pdf	Add Attachment	Delete Attachment
		View Attachment	
Attach Current & Pending Support	1245-Li C&P.pdf	Add Attachment	Delete Attachment
		View Attachment	

Project Abstract

Summary: The U.S. faces urgent pressures to grow and fully prepare the next generation of STEM workers to remain globally competitive both economically and militarily. Building from an existing high-impact pilot focused on evidence-based practices, the University of Missouri–Kansas City (UMKC) proposes a novel workforce pipeline that will provide an equitable and competency-based recruitment/training path for cultivating a diverse, agile, and world-class STEM workforce. The pipeline targets sophomore STEM students and benefits them early in their college education with (1) the latest information about Naval STEM opportunities and careers, (2) data analytics and technical research skills tailored to Naval STEM workforce communities, (3) customized internship programming through UMKC Career Services, and (4) paid research internships with UMKC faculty executing on projects spanning all five broad Naval R&D priority areas. Armed with these resources, skills, and experiences, program participants will apply to Naval STEM national lab and industry internships during their fall junior year. We will meet these objectives by designing and delivering four new Research Skills Training (RST) courses annually that are customized to Naval-related research across campus, by mentoring research interns in the real-world application of their newly-acquired skills, and by coordinating campus-wide promotion of Naval STEM programs and careers at each program step.

Significance: Research experience with a faculty member is a high-impact practice known to bolster 21st century workforce skill development, STEM career aspirations, and STEM degree completion rates. At UMKC, 30-40% of incoming students routinely express plans to participate in research, yet, most never do. The proposed pipeline delivers a proven approach for engaging this untapped pool of STEM talent with impactful educational experiences early in college.

Pipeline Steps: The proposed pipeline starts with student-driven recruitment in all freshmen General Education science courses to encourage students to enroll in an RST course. While this project targets sophomores, RST courses will be open to all interested students and will not require prerequisites. RST enrollees will receive 15 weeks of broadly transferable STEM workforce training and customized introduction to a unique Navy STEM priority. RST completers will be supported to apply for on-campus research internships with a program Co-PI during their sophomore spring and/or summer, and supported to apply for research internships off-campus with Naval labs and industries.

Outcomes: Implementation of this innovative program will increase the number of STEM students from diverse backgrounds who gain competitive skills and real-world experience in Naval priority areas, who graduate with STEM degrees, and who join the STEM workforce. The program will expose over 3,000 freshmen to Naval STEM priorities and opportunities. To meet our equity-focused programmatic goals, the program will provide 75 RST tuition scholarships for underrepresented students during the 3-year period of performance; these students will have first consideration for selection of 54 total campus paid research internships (44-75% underrepresented student participation). We anticipate annual RST enrollments increasing from 44 to 114, with 34-43% underrepresented minority student participation leading to substantial graduation improvements, and 99-203 total UMKC applications to Naval and industry internships. The broader impact of the RST course framework is it provides an efficient research training pathway, and an effective intern vetting and onboarding system, to help STEM faculty and the Department

“Equity Forward Workforce Development Pipeline for Naval STEM Superiority”

of Navy expand their workforce development capacity. The project outcome will be an equity-minded educational pathway for sustainably increasing the number of applications to Naval lab/industry internships and careers. (Approved for public release.)

Budget Justification

DIRECT LABOR

PI Daniel McIntosh ((b) (4)/month base salary) will devote 5% effort to the project to coordinate the overall program and serve as lead project manager. Additionally, PI McIntosh will assist the Research Skills Training (RST) faculty with course development, work with the UMKC administration to obtain course approval, and will be responsible for all reporting. PI McIntosh serves as the UMKC Director of STEM Education Research and Chair of the Department of Physics and Astronomy. Additionally, PI McIntosh will be requesting a one-course buyout annually during the period of performance. A ((b) (4)) cost of living increase has been included in Years 2-3. (Requested Amount: ((b) (4)) salary; ((b) (4)) course buyout)

Research Skills Training (RST) Faculty. New RST courses will be designed and instructed by four tenured faculty to provide students applied exposure to methodologies, facilities, and standard practices common to a discipline-specific, DoN-related research focus. A base stipend of ((b) (4)) in Year 1 will be provided for each faculty member for curriculum construction, execution, and supervision of student interns, and a ((b) (4)) salary stipend will be provided in Years 2-3 for RST execution and supervision of student interns. (Requested Amount: ((b) (4)))

Program Evaluation. Dr. Karin Chang, Associate Director of the UMKC Urban Education Research Center and Associate Research Professor in the School of Education, will devote 5% effort to the project and will provide program evaluation services during the period of performance to assure program objectives and deliverables are met. Additionally, Dr. Chang will advise the research team on continuous improvement strategies, will contribute to reports, and will supervise Ms. Jenny Frenzel Senior Research Assistant (devoting 17% effort), who will also assist with program evaluation. Dr. Chang has over 30 years of experience managing federal evaluations and Ms. Frenzel has over 14 years of experience in educational and nonprofit program evaluation. (Requested Amount: ((b) (4)))

Inclusive Excellence Training. Dr. Alexis Petri will be responsible for delivering Inclusive Excellence workshops for the RST faculty in Years 1 and 2. Co-PI Petri is an Associate Research Professor and has an appointment in the Office of the Provost and Executive Vice Chancellor and a research faculty appointment in the Department of Psychology in the UMKC College of Arts & Sciences. (Requested Amount: ((b) (4)))

Graduate Assistants. Four Graduate Assistant positions are being requested to assist with creation and execution of the RST courses in collaboration with RST faculty. These positions will be part-time in Years 1-3 and will assist with RST setup and delivery alongside RST faculty. Additionally, one part-time Graduate Assistant is being requested in Career Services to assist with internship programming and support. (Requested Amount: ((b) (4)))

Undergraduate Research Program Ambassadors. Five Undergraduate Research Program Ambassadors are requested to assist with program marketing and peer recruitment during the period of performance. Ambassadors will be responsible for social media marketing, visits to General Education courses to make announcements about the program, and will assist with

overall program recruitment. A (b) (4) stipend will be provided to each Ambassador annually in the fall semester, and a (b) (4) stipend will be provided to each Ambassador annually in the spring semester. (Requested Amount: (b) (4))

Undergraduate Research Interns. As part of the program framework, undergraduate students will be selected to complete paid research internships with RST faculty to participate directly in DoN-related research. In the spring semesters, we anticipate placing 27 students in part-time research internships on campus (Y1 – 8, Y2 – 9; Y3 – 10). A (b) (4) stipend will be provided to each student. In the summer semesters, we anticipate placing 54 students in full-time research internships on campus (Y1 – 16, Y2 – 18, Y3 – 20). A (b) (4) stipend will be provided to each student. (Requested Amount: (b) (4))

ADMINISTRATIVE AND CLERICAL LABOR

Administrative Assistant (base salary (b) (4)/year) will devote 20% effort per year to assist with the administrative responsibilities including human resources, financial management, scheduling, and report dissemination. A (b) (4) increase has been calculated for Years 2-3 to account for inflation. (Requested Amount: (b) (4))

FRINGE BENEFITS AND INDIRECT COSTS

Fringe benefits for full-time faculty and staff are calculated at (b) (4) per year. Fringe benefits for part-time staff are calculated at (b) (4) per year. Fringe benefits for student employees/internships are calculated at (b) (4) annually. (Total Request: (b) (4))

The University of Missouri System has a (b) (4) federally negotiated organized research rate charged on modified direct costs applied to all grants and contracts with the Federal Government.* (Total Request: (b) (4))

OTHER DIRECT COSTS

Graduate Assistant Tuition. Partial tuition is requested for graduate students assisting with implementation of the RST courses. A total of 15 credit hours will be provided for five Graduate Assistants annually (3 credit hours per GA). Utilizing the 2020-2021 academic year rates, UMKC charges \$397.60 per credit hour for graduate coursework. A (b) (4) increase has been included in Years 2 and 3 to adjust for projected campus tuition increases. (Requested Amount: \$18,252)

Underrepresented in STEM Tuition Scholarships. In an effort to meet our equity-focused programmatic goals, a total of 75 tuition scholarships (Y1 – 15, Y2 – 30, Y3 – 30) will be provided to underrepresented minority undergraduate students in STEM to eliminate the financial barrier of enrolling in RST courses. Utilizing the 2020-2021 academic year rates, UMKC charges \$301.60 per credit hour for undergraduate coursework. The RST courses will be

three credit hours (\$904.80 total per student per course). A (b) (4) increase has been included in Years 2 and 3 to adjust for projected campus tuition increases. (Requested Amount: (b) (4))

TOTAL REQUESTED: \$758,280. PI McIntosh was approved to submit a budget over the \$750,000 limit per Dr. Marielle Hjelm on 6 October 2020. The rationale for this budget extension is to include additional Underrepresented in STEM Tuition Scholarships for students interested in enrolling in RST courses.

*[University of Missouri System F&A Rate Agreement Letter](#)

Daniel H. McIntosh, PhD

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(a) Professional Preparation

Undergraduate	U California, at Los Angeles	Astrophysics	B.S. 1994
Graduate	The University of Arizona	Astronomy	Ph.D. 2001
Postdoctoral	U Massachusetts at Amherst	Extragalactic	2001–2008

(b) Current and Past Appointments

Chair, UMKC Department of Physics & Astronomy (2020–present)
Director of STEM Education Research, UMKC (2019–present)
Affiliated Faculty, Missouri Institute for Defense and Energy (2019–present)
Extraordinary Professor of Physics, University of the Western Cape (2017–present)
Associate Professor of Physics & Astronomy, UMKC (2014–present)
Provost Fellow, UMKC (2018–2019)
Norman Royall Distinguished Professor, UMKC (2017–2019)
Affiliate Director (UMKC), NASA Missouri Space Grant Consortium (2010–2018)

(c i) Products Most Closely Related to Proposed Project

- Received the 2016 University of Missouri System President’s Award for Innovative Teaching, the highest annual honor awarded to one faculty from the 4-campus system for ***substantial efforts directly related to this proposal*** – implementation of active learning in unique introductory and advanced STEM courses impacting over 1500 non-science and STEM majors, ***creating a novel undergraduate research training model providing 39 STEM majors (to date) with skills to participate in astrophysics research***, and founding innovative initiatives to broaden participation in STEM. These efforts have led to a doubling of physics majors since 2012, and increases from 10-33% (0-10%) in female (URM) majors, despite falling enrollments in the college housing physics.
URL: https://www.umsystem.edu/ums/news/news_releases/news_042916
- (initiated model Inclusive Excellence program) A Bridge to the Stars (ABtS) High School-to-College Pipeline Program** (2012–present)
To provide broadening opportunities into STEM, provides urban 10th-12th graders an immersive, confidence-building experience in STEM through scholarships, near-peer mentoring, and active learning in first-year astronomy courses I offer on campus; partner with >10 Kansas City area high schools; includes substantial training of near-peer mentors.
Participants: 75 urban 10th-12th graders (80% URM, 80% female); 20 UMKC-student near-peer mentors (10% URM, 70% female)
Mission: ABtS is committed to actively engaging students from all backgrounds in enriching and impactful experiences related to astronomy, the physical sciences, and STEM.
URL: <http://cas.umkc.edu/hscp/students-and-parents/dual-credit-options/bridge-to-the-stars/>
Related: <http://theconnector.missouri.edu/success-stories/daniel-mcintosh-astronomy-astrophysics/>
- (initiated model Inclusive Excellence program) Women in Science Student Group** (Wi-Sci; 2017–present)
To address persistent lack of gender representation among most STEM discipline cohorts at UMKC, campus-wide student group to help female STEM majors and graduate students build a collaborative network of students from all backgrounds and genders who support the empowerment and success of women STEM students.
URL: <https://info.umkc.edu/unews/this-is-where-you-belong-women-in-science-offers-support-for-stem-majors/>
- McIntosh, D. H. *Actively Encouraging Learning and Degree Persistence in Advanced Astrophysics Courses*. American Astronomical Society Meeting #233, Seattle, WA, Jan. 6-10, 2019. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2019AAS...23317504M>

(c ii) Other Significant Products Related to Proposed Project

1. Crouse, J. S. & McIntosh, D. H. *A Bridge to the Stars: Bringing Underrepresented High Schoolers to the STEM Table* American Astronomical Society Meeting #235, Honolulu, HI, Jan. 4-8, 2020. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2020AAS...23520308C>
2. Arnold, J. S. & McIntosh, D. H. *Overcoming the STEM Engagement Deficit in URM and Low-Income Students: A Bridge to the Stars High School-to-College Pipeline* American Astronomical Society Meeting #233, Seattle, WA, Jan. 6-10, 2019. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2019AAS...23325401A>
3. Weston, M. E. & McIntosh, D. H. *Empowering Women in STEM at the University Level* American Astronomical Society Meeting #233, Seattle, WA, Jan. 6-10, 2019. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2019AAS...23317502W>
4. McIntosh, D. H. *Actively Encouraging Learning and Degree Persistence in Advanced Astrophysics Courses*. American Astronomical Society Meeting #231, Wash. DC, Jan. 8-12, 2018. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2018AAS...23121605M>
5. McIntosh, D. H. & Jennings, D. H. *A Bridge to the Stars: A Model High School-to-College Pipeline for Encouraging Positive STEM Identities*. American Astronomical Society Meeting #231, Wash. DC, Jan. 8-12, 2018. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2018AAS...23121601M>
6. McIntosh, D. H. *A Bridge to the Stars: A Model High School-to-College Pipeline to Improve Diversity in STEM*. American Astronomical Society Meeting #229, Grapevine, TX, Jan. 3-7, 2017. Unpublished conference paper. <https://ui.adsabs.harvard.edu/abs/2017AAS...22931404M>

(d) Synergistic Activities Closely Related to Proposed Project

1. **(invited participant “thought leader”)** at Missouri Department of Higher Education and Workforce Development *Equity in Missouri Higher Education Summit & Equity Hackathon*. (Invited by: Angelette Prichett, Director of Academic Affairs, DHEWD), Oct 29–30, 2019; Columbia, MO. <https://dhewd.mo.gov/equity-project.php>
2. **(invited participant)** Kauffman Foundation *ReThinkEd Conference*. (Invited by: Dr. Leigh Anne Taylor Knight, Exec Dir and CEO DeBruce Foundation), Sep 11–12, 2019; Kansas City, MO. <https://rethinkd.kauffman.org/>
3. **(invited participant)** AAC&U and Project Kaleidoscope 2019 Knowledge Exchange Institute *Accelerating STEM Higher Education Reform and Broadening Participation*. (Invited by: Project Kaleidoscope) May 21–24, 2019; Washington, DC. <https://www.aacu.org/knowledge-exchange/KE-Institutes/2019-DC>
4. **(UMKC representative, completed training)** AAC&U and Project Kaleidoscope 2018 STEM Leadership Institute, July 17–22, 2018; Adamstown, MD. <https://www.aacu.org/summerinstitutes/sli/2018>
5. Chancellor’s Diversity Council (2016–2017)

CURRENT & PENDING SUPPORT

Dr. Daniel McIntosh

"Equity Forward Workforce Development Pipeline for Naval STEM Superiority"

Title of Application & Summary	Source & Amount of Funding	Percentage Effort Devoted to Each Project	Identify Prime Applicants and Complete List of Sub-Awards, If Applicable	Technical Contact (Name/Address/Phone/E-mail)	Period of Performance	Current/Pending	Related/Degree Overlap
"Equity Forward Workforce Development Pipeline for Naval STEM Superiority"; STEM Education	Office of Naval Research, (b) (4)	8.3%	UMKC, Daniel McIntosh, PI	Daniel McIntosh; 5110 Rockhill Road, Kansas City, MO 64110; 816-235-5324; mcintoshdh@umkc.edu	6/1/21 - 5/31/2024	Pending	N/A
UMKC Program Proposal and Budget Discussion for Opportunities in NASA STEM FY2020 to FY2023	NASA (b) (4)	2%	UMKC, Travis Fields, PI; Daniel McIntosh, Co-PI	Dr. S. N. Balakrishnan, Director, NASA-Missouri Space Grant Consortium, Missouri University of Science & Technology, 400 W. 13th St., Rolla, MO 65409, (573) 341-4675, bala@mst.edu	5/31/20 - 5/30/24	Pending	Minimal Overlap
Increasing Research and Funding Capacity with Two Successful Student Engagement Pilots	UMKC Funding for Excellence, (b) (4)	8%	UMKC, Daniel McIntosh, PI	Chris Liu, Vice Chancellor for Research and Economic Development, UMKC Office of Research Services, 5211 Rockhill Rd., Kansas City, MO 64110, (816)235-5839, yliu@umkc.edu	1/1/21 - 12/31/21	Current	Minimal Overlap
KC Urban Renewal Engineering (KCURE) Fellows	National Science Foundation, (b) (4)	<1%	UMKC, PI Cairns; Daniel McIntosh, Co-PI	Keith Sverdrup, Cognizant Program Officer, National Science Foundation, 2415 Eisenhower Ave., Alexandria, VA 22314, (703) 292-4671, ksverdrup@nsf.gov	1/1/20 - 12/31/25	Current	Not Related, No Overlap

Project Abstract

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